

REMARKS

The Official Action mailed April 24, 2002 has been received and its contents carefully noted. Filed concurrently herewith is a *Request for One Month Extension of Time*, which extends the shortened statutory period for response to August 24, 2002, which is a Saturday, thus August 26, 2002, the following business day. Accordingly, Applicant respectfully submits that this response is being timely filed.

Applicants note with appreciation the consideration of the Information Disclosure Statement filed on December 19, 2001. Paragraph 2 of the Official Action asserts that the Information Disclosure Statement filed June 29, 2002 does not comply with 37 CFR 1.98(a)(2). On the face of the signed copy of the IDS, the Examiner has crossed through one Japanese reference and seven articles. The Applicants respectfully submit that all of the references are available in parent application Serial No. 09/352,198. Specifically, the IDS is in compliance with 37 CFR 1.98(d)(1) which provides an exception to Rule 98(a). In accordance with Rule 98(d)(1), the IDS dated June 29, 2002 refers to the '198 application, which contains legible copies of all listed references. If the Examiner cannot locate a legible copy of a reference in the '198 application, the Applicants request that the Examiner bring this to the attention of the Applicants in a subsequent Official Action so that copies can be provided. Otherwise, the Applicants respectfully request the consideration of the heretofore unconsidered references.

Claims 1-46 are pending in the present application, of which claims 1-12, 19 and 20 are independent. For the reasons set forth in detail below, these claims are believed to be in condition for allowance.

Paragraph 1 of the Official Action objects to the Preliminary Amendment filed on December 19, 2001 under 35 U.S.C. 132 because it allegedly introduces new matter into the disclosure. The Official Action asserts that the newly added term "organic" does not have support in the disclosure as originally filed.

However, U.S. Patent Application Serial No. 09/352,198, which is the parent application of the subject application, discloses an "organic" electroluminescence display device in claim 19 as originally filed. As noted in MPEP 2163.06, "The claims as filed in the original specification are part of the disclosure and therefore, if an application as originally filed contains a claim disclosing material not disclosed in the remainder of

the specification, the applicant may amend the specification to include the claimed subject matter. *In re Benno*, 768 F.2d 1340, 226 USPQ 683 (Fed. Cir. 1985)." Furthermore, the Utility Patent Application Transmittal filed on July 29, 2001 mentions that the entire disclosure of the prior application is hereby incorporated by reference. Therefore, as noted in the remarks submitted with the Preliminary Amendment filed on December 19, 2001, Applicants do not believe that the Preliminary Amendment introduces new matter and favorable reconsideration is requested in view thereof.

Paragraph 3 of the Official Action objects to claims 21-30 due to minor informalities. In response, Applicants have amended claims 21-30 to correct the informalities as required. Reconsideration is requested.

Also, claims 4-6, 10-12, 19 and 20 have been amended to correct minor matters of form. These amendments are merely clarifying in nature, and should not in any way affect the scope of protection afforded the claims for infringement purposes, particularly, under the Doctrine of Equivalents.

Paragraph 5 of the Official Action rejects claims 33-46 under 35 U.S.C. 112, first paragraph, as containing subject matter (the term "organic") which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As discussed above, however, since the term "organic" is not new matter, Applicants respectfully submit that the claim rejection under 35 U.S.C. 112, first paragraph is improper and favorable reconsideration is requested.

Paragraph 7 of the Official Action rejects claims 1-6, 18-19, 31 and 32-46 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. With respect to claims 1-6 and 19, Applicants have amended such claims in order to overcome the claim rejection.

With respect to claims 18, 31-32 and 33-46, the Official Action asserts that the scope of the claims cannot be determined and the claims are vague and indefinite. The Official Action further asserts that the base independent claim clearly calls for a process of forming the device which is a thin crystalline silicon film transistor (TFT).

However, all the independent claims recite a method of manufacturing a semiconductor device. Further, in page 1, lines 11-16 of the specification, it is disclosed that the term "semiconductor device" means any devices functioning by using semiconductor characteristics, and thus, the semiconductor device includes not only a single semiconductor component such as a TFT, but also an electrooptical device or semiconductor circuit including TFTs and any type of electronic equipment having a semiconductor component. Further, Embodiment 5 teaches a variety of types of electronic equipment such as a personal computer, etc., and further teaches that the present invention can be applied to each of these types of electronic equipment. Therefore, Applicants respectfully submit that the scope of the claims is clear and definite.

Paragraph 9 of the Official Action rejects claims 1-17 and 19-30 as anticipated based on U.S. Patent 6,077,731 to Yamazaki et al. Claims 1-12 recite irradiating the semiconductor film with laser light in air, and claims 19 and 20 recite irradiating the semiconductor film with laser light in an atmosphere containing oxygen. Although the Official Action asserts that Yamazaki teaches irradiating the semiconductor film with laser light in air, no such teaching or suggestion is found in Yamazaki.

Further, the Official Action asserts that Yamazaki teaches leveling the surface of the semiconductor film by heating and a concentration of oxygen or oxide compound less than 1 ppm. However, it should be noted that Yamazaki teaches an oxygen concentration of less than 1 ppm in a crystallization step as described in the last paragraph of column 36. On the other hand, claims 4-6, 10-12, 19 and 20 of the present invention recite an oxygen or oxygen compound concentration of 10 ppm or less in a leveling step which is different from the crystallization step.

Further, the Official Action asserts that Yamazaki teaches leveling the surface of the semiconductor film by heating in a reducing atmosphere such as hydrogen or inert gases such as nitrogen. The Applicants respectfully disagree. Again, it should be noted that Yamazaki teaches the use of reducing or inert gases in the crystallization step as described from column 36, line 51 to column 37, line 5 and not in a leveling step as claimed. The Applicants could not find a reducing atmosphere or inert gas in the leveling step as recited in claims 2-3, 5-6, 8-9 and 11-12 of the present invention.

For the reasons stated above, the Official Action has not formed a proper anticipation rejection. Accordingly, reconsideration and withdrawal of the rejection of independent claims 1-12, 19 and 20 under 35 U.S.C. § 102(e) is in order and respectfully requested. Likewise, it is believed that dependent claims 13-18 and 21-46 are likewise allowable in that they depend from what is believed to be allowable base claims 1-12, 19 and 20.

Should the Examiner believe that anything further would be desirable to place this application in better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,

  
Eric J. Robinson  
Reg. No. 38,285

Robinson Intellectual Property Law Office, P.C.  
PMB 955  
21010 Southbank Street  
Potomac Falls, Virginia 20165  
(571) 434-6789

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend claims 1-6, 10-12 and 19-30 as follows:

1. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating after removing said oxide film.

2. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in a reducing atmosphere after removing said oxide film.

3. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in an inert gas after removing said oxide film.

4. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in an atmosphere after removing said oxide film, a concentration of oxygen or [a] an oxygen compound contained in said atmosphere is 10 ppm or less.

5. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in a reducing atmosphere after removing said oxide film, a concentration of oxygen or [a] an oxygen compound contained in said reducing atmosphere is 10 ppm or less.

6. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in an inert gas after removing said oxide film, a concentration of oxygen or [a] an oxygen compound contained in said inert gas is 10 ppm or less.

10. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

treating a surface of the semiconductor film with a hydrofluoric acid after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating after the treatment with said hydrofluoric acid in an atmosphere, a concentration of oxygen or [a] an oxygen compound contained in said atmosphere is 10 ppm or less.

11. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;

irradiating said semiconductor film with laser light in air for crystallizing said semiconductor film;

treating a surface of the semiconductor film with a hydrofluoric acid after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating after the treatment with said hydrofluoric acid in a reducing atmosphere, a concentration of oxygen or [a] an oxygen compound contained in said reducing atmosphere is 10 ppm or less.

12. (Amended) A method of manufacturing a semiconductor device comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;  
irradiating said semiconductor film with laser light in air for crystallizing  
said semiconductor film;

treating a surface of the semiconductor film with a hydrofluoric acid after  
the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating after the  
treatment with said hydrofluoric acid in an inert gas, a concentration of oxygen or [a] an  
oxygen compound contained in said inert gas is 10 ppm or less.

19. (Amended) A method of manufacturing a semiconductor device  
comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;  
irradiating said semiconductor film with laser light in an atmosphere  
containing oxygen for crystallizing said semiconductor film;

removing an oxide film [from] formed on a surface of the semiconductor  
film by etching after the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating in an atmosphere  
after removing said oxide film, a concentration of oxygen or [a] an oxygen compound  
contained in said atmosphere is 10 ppm or less.

20. (Amended) A method of manufacturing a semiconductor device  
comprising the steps of:

forming a semiconductor film comprising silicon over a substrate;  
irradiating said semiconductor film with laser light in an atmosphere  
containing oxygen for crystallizing said semiconductor film;

treating a surface of the semiconductor film with a hydrofluoric acid after  
the irradiation of the laser light; and

leveling the surface of the semiconductor film by heating after the  
treatment with said hydrofluoric acid in an atmosphere, a concentration of oxygen or [a]  
an oxygen compound contained in said atmosphere is 10 ppm or less.

21. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 19, wherein the step of leveling the surface of said semiconductor film is conducted by furnace annealing.

22. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 20, wherein the step of leveling the surface of said semiconductor film is conducted by furnace annealing.

23. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 19, wherein the step of leveling the surface of said semiconductor film is conducted between 900 and 1200 °C.

24. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 20, wherein the step of leveling the surface of said semiconductor film is conducted between 900 and 1200 °C.

25. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 19, wherein said atmosphere in said leveling step contains an inert gas.

26. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 20, wherein said atmosphere in said leveling step contains an inert gas.

27. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 19, wherein said atmosphere in said leveling step contains a reducing atmosphere.

28. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 20, wherein said atmosphere in said leveling step contains a reducing atmosphere.

29. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 19, further comprising a step of treating a surface of the semiconductor film with a buffered hydrofluoric acid before the irradiation of the laser light.

30. (Amended) A method of manufacturing a semiconductor device according to [any one of] claim 20, further comprising a step of treating a surface of the semiconductor film with a buffered hydrofluoric acid before the irradiation of the laser light.